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Life History and Habits of Anthocharis (Synchloe) Olympia Edw.

By CHARLES ALBERT SHULL, Lexington, Kentucky.

(Contributions from the Biological Laboratory of Kentucky Univ., No. 1.)

Thirty-five years ago William Henry Edwards* gave us the first description of *Anthocharis olympia* from specimens captured near his home at Coalburgh, West Virginia. Later, Strecker,† and Scudder‡ also, gave accurate descriptions of the imago, in their works on butterflies.

This species was found to have a very broad range, being reported in most of the states from West Virginia to Colorado, and from the Northwest Territory in Canada to Texas. Notwithstanding its wide distribution, nothing was known concerning its preparatory stages for over twenty years. It was

*Edwards, W. H., 1871.—Trans. Am. Ent. Soc., vol. iii, p. 266.

†Strecker, F. H. H., 1874.—Lepidoptera Rhopaloceres and Heteroceres, Indigenous and Exotic. p. 64. Pl. viii. Fig. 9.

‡Scudder, S. H., 1889.—Butterflies of the Eastern United States and Canada, vol. iii. p. 1844.

not until 1891 that Mr. Edwards captured a female in the act of depositing her eggs on a species of *Sisymbrium*. He watched the development of the larvæ and gave a very brief description of them in the supplement to his monumental work, "The Butterflies of North America," in 1897. ||

His description of the adult larva is fairly accurate, but the only specimen which attained its full growth died in pupation, and so our knowledge of its life history was left incomplete.

In the spring of 1905 my attention was called to the presence of *Anthocharis olympia* in the dune region about the southern end of Lake Michigan. During the past season it has been possible for me to study the complete life history and the habits of this extremely interesting butterfly, both in its native habitat and in the laboratory. The locality studied lies between Clarke Junction and Pine, Indiana.

The first collecting trip to that region was made April 28, 1906, and a number of specimens were captured, all of them being the typical *A. olympia*, as figured by Edwards,§ although some of them show a larger "white interior patch" on the forewings than the one figured from Whiting, Indiana.

It was found to alight almost exclusively upon the flower clusters of *Arabis lyrata* L., the only Crucifer which can be found in bloom at this early season in the dune region. A second visit was made May 12th, and more adults were captured, but none of them seemed to be ovipositing. Being firmly convinced that *A. lyrata* was the food plant, I made a careful search, and, after a great many had been examined, was rewarded by finding a few eggs.

Edwards describes the eggs as red. If they are red when first laid, they must turn orange yellow as development proceeds, for every egg seen was of this color. The eggs are laid singly, usually only one, and very rarely more than two, upon a single plant; and in this case the eggs may have been laid by different females. They are nearly always placed on the sepals of the younger, centrally located buds, rarely on the

||Edwards, W. H., 1897.—The Butterflies of North America, vol. iii. Supplement, p. 2.

§Edwards, W. H., But. of No. Am., vol. iii. Pl. 2. Anth. Fig. 5.

peduncle just below the bud. Fig. 1 shows the usual situation of the egg.

It is important to the young larva that these young central buds be chosen rather than the outer ones which bloom first. For the sepals of *A. lyrata* are caducous; and if the eggs were placed on the older buds, the sepals would fall before the egg hatched, and the young larva would die of starvation. This happened in one instance in the laboratory.

Just before the egg hatches, it changes from orange yellow to a dull yellowish brown. The larva, measuring a little over 1 mm. in length, eats away one side of the shell, creeps out, and usually begins to feed at once, leaving the shell as when it emerged. My observations on this point are at variance with the statement commonly made, that butterfly larvæ devour the shells from which they emerge before beginning to feed upon the food plant.

The duration of the instars varies with different individuals, and the moults occur more rapidly indoors than out, especially if an abundant food supply is kept on hand. The larva watched most closely as regards the time of moulting, hatched on May 13th. The first moult occurred at 9.30 A. M., May 16th; the second on the 18th, the third on the morning of the 20th, and the last early on the 22d. The adult larva, 28 mm. in length, left its food plant near noon on the 25th, and began to crawl about on the sides of the bell jar which was kept over the vessels containing the food, as if seeking a suitable place for pupation. It continued this for more than four hours, and then became very quiet. At six o'clock it was spinning the silken carpet on which they always pupate, and a half hour later it had begun the "button" to which the posterior end is finally attached.

It is interesting to note that this mass of silk is nearly always spun while the larva hangs head downward. There seems to be a geotactic stimulus of some kind, for in one case the larva was carefully inverted four times successively after the carpet had been spun, and each time after about ten minutes it turned slowly around without leaving the web already spun, and assumed this inverted position. After turning

the last time it began to spin the button of silk, and then, although its position was reversed, it continued spinning for an hour, and finally attached itself.

After the spinning was completed, the larva turned slowly around and felt about carefully with the posterior end until it came into contact with the mound of silk, when, with a deft motion, the hooks of the anal prolegs were inserted and twisted firmly into it. Thus it is seen that the stimulus which impels the reversed position during the spinning really anticipates an upright position for the pupa.

After a short period of rest the larva began to spin its girdle. This was accomplished exactly as by *Pieris rapae* L. The head and thorax are bent sharply backward and the thread is attached at one side of the body. Keeping the anterior end in this flexed position, it carries its head by torsion to the opposite side, where the thread is again attached. Back and forth it keeps spinning, strand by strand, until the girdle is strong enough to support the pupa properly. Two specimens were observed, and the one spun 24 strands, the other 33.

Thus the girdle spans twice the diameter of the body, and perfect allowance is made for the increased diameter of the pupa. When the spinning of the girdle is completed, which takes from 20 to 25 minutes, the head is slowly and carefully withdrawn from the loop of silk. On the following day, May 26th, about 3 P. M., the pupa emerged.

The entire larval period, then, is from 12 to 14 days in the laboratory, some growing faster, others slower, than the one described above. But in the field the period seems to be longer. On May 12th no larvæ were to be seen on any of the food plants, and on May 26th, the same day pupation occurred in the laboratory, the larvæ in the field were in all stages from the second to the beginning of the fifth instar. Assuming that other eggs of the same age as those collected were left in the field, the larval period must be several days longer than in the laboratory. Probably this can be accounted for by the cooler nights and less abundant food in nature, both of which would tend to decrease metabolic processes and so increase the length of the larval life.

The color changes which take place during this larval and early pupal life are very remarkable. Eggs sectioned at the time they turn brownish are found to contain a fully formed larva. The body is doubled up in the egg with the ventral surfaces together, the head lying next to the micropyle.

At birth the larva measures less than 1.5 mm. in length. The body is lemon-yellow with grayish tubercles bearing large glandular hairs, just as in other Anthocharid larvæ. The head is very dark, and before the first moult, becomes a shiny jet black.

After the first moult the head is no longer black, but greenish gray, and the whole body becomes green, due, perhaps, as Poulton* suggests, to transformed plant pigments. Before the end of the second instar the longitudinal stripings begin to show. There is a grayish-green median dorsal line; then on each side, a subdorsal light yellowish-green line, a lateral gray-green line, and a narrow infralateral yellow-green line bebetween the spiracles and the base of the prolegs. The ventral surface and legs are grayish-green.

During the third instar the colors as described by Mr. Edwards are fully developed. The dorsal and lateral lines become slaty in hue, shading out into green which merges into the yellow of the subdorsal line. The infralateral line becomes pure white beneath the spiracles, and a very narrow light-yellow line lies just below the white.

In the fourth and early part of the fifth instar these colors do not change except to become brighter and more contrasted. The dorsal and lateral slate-green lines are certainly correlated with physiological processes, for they lie exactly peripheral to the dorsal and lateral blood vessels, which may be seen pulsating beneath them if examined with a hand lens. As the last instar is nearing its end, the brilliancy of the color pattern is lost. The green becomes ashy gray-green, and the yellow portions turn olive and are somewhat reduced in size.

Shortly after this a peculiar purplish tinge makes its appearance at the posterior end and about the thorax. This

*Poulton, E. B., 1893.—Experimental Proof that the Colors of certain Lepidopterous Larvæ are largely due to modified plant pigments derived from the food. Proc. Roy. Soc. of London, vol. liv., pp. 417-430.

purplish color gradually extends anteriorly until the whole body shows it. This change immediately precedes and accompanies the wandering of the larva while seeking a place to pupate. The color becomes very dark, and by the time the larva has spun its girdle, every trace of green has disappeared from the body. The dorsal and lateral green stripes, the ventral surface and the head are all very dark bluish-purple. On close observation the traces of the subdorsal yellow lines can still be seen. The infralateral line of white remains very brilliant, and is accompanied by a trace of the yellow; but it no longer extends the whole length of the larva. It is interrupted in the second and third thoracic segments, which become swollen and turn purple as the wing rudiments develop beneath the old cuticle.

As pupation approaches, the color lightens somewhat, and when the pupa emerges it is a beautiful rosy purple, with a white infralateral line extending from the tip of the wing to the tip of the abdomen. A short time before pupation takes place, very slight peristaltic contractions begin in the abdominal region, passing anteriorly. These contractions probably serve two purposes: to loosen the old cuticle, and to distend the anterior portions of the body where the rupture of the larval skin is to take place. The weak contractions give way to very strong peristalsis just as pupation commences. The old cuticle ruptures over the thorax and down the median line of the head, and is soon cast. As a last act the anal segment is withdrawn from the old skin, and the cremaster is thrust into the button.

The beautiful color of the pupa does not last long; within a few hours the rose-purple fades, being reduced to various shades of brown.

Since no account of the pupa has ever been given, a more detailed description might be appreciated. In profile the dorsal line is almost straight, being but slightly concave just over the wings. The average length is 18 mm.; the greatest width, 3 to 3.5 mm. at a point 6 mm. from the anterior end; the greatest depth is 3.5 to 4 mm. about 9 mm. from either end. Figures 5 and 6 show the general shape of the pupa.

When the final color change occurs, the dark anterior region becomes dark brown; and the most important elements of the color pattern are longitudinal dark lines, of which there are five usually well marked: a median dorsal, two laterals, and two which lie more ventrally to either side of the median ventral line. The latter is marked by only a few dark dots back of the apices of the wings. The paler dorsal areas lying between these darker lines are marked with small black dots which seem to occupy the same relative position on the segments as the black tubercles on the larvæ. See Figures 2, 3 and 4. The wing cases also bear dots lying in rows exactly above the veins of the wings, and a submarginal row between the veins. The antennæ are also outlined by rows of minute dots.

Experience has shown that there is considerable variation in the minute markings of both larvæ and pupæ, and more detailed accounts are of little value for this reason.

The habits of the imago and the full-grown larva in their native habitat are worthy of careful study wherever this interesting species may be found. The species is monogoneutic, and the butterfly is on the wing from early in April to the end of May, depending on the season. Thus the pupal life extends over a very long period.

The conditions of life are extremely rigorous in this region. The temperature extremes of summer and winter are excessive and subject to great and sudden changes; the relative humidity is low, even as low as 30 per cent. at times; the sand blast is strong enough to erode the standing trunks of dead trees; and enemies, such as tiger-beetles and ants, abound. It is therefore of interest to learn where in such a region the pupa would spend ten months of the year.

On May 26th a number of half-grown larvæ were located, and on June 1st the region was visited again. Most of the larvæ had disappeared, but at one of the stations a single larva remained. It was already purplish, which indicated that it was ready to leave its food plant. Carefully removed from the plant to the ground it was allowed to go whither it would. It crawled along usually on some plant stems a few inches

above the ground. In that way it avoided the unpleasant heat of the sand (which was very often found to be above 40° C.), and also any tiger-beetles that might have been lying in wait.

After a short time it entered a clump of the bunch grass, *Andropogon scoparius* Michx., which is very abundant in this region. The grass clump was about a foot in diameter, and the larva clambered about in it, up and down and back and forth for nearly six hours. Finally it became quiet and began to spin its scala or carpet of silk just a couple inches from the ground, in the midst of the grass. I was compelled to leave it at this point; but on the next visit, June 9th, the pupa was found in the same situation, head upward.

Many similar clumps of *Andropogon, Elymus,* and other dune grasses were searched carefully for other specimens, but it was like hunting for a needle in a haystack, since the grass clumps are very numerous and the pupæ relatively rare. No others were found.

However, this may be taken as a probably typical habitat. And certainly none could be found better adapted to a long quiescent existence. *Andropogon* retains its dead leaves and stems the year round, the new ones growing up through the old ones. The excessive heat of summer is mitigated by the shade of the leaves, protection from the winter cold is secured in the same way, the humidity of the atmosphere is somewhat more constant in such a situation. The dune grasses are noted for their ability to stop the sand blast and form embryonic dunes about their bases wherever the sand is shifting. And the love of tiger-beetles for open sand is well known. It is an admirably chosen location.

The habits of flight of the imago are very interesting. It flies near the ground, following a rather uncertain course, dancing tremulously this way and that. It requires but a few moments' observation to note, however, that the direction of movement is determined largely by mechanical factors. Even in a gentle breeze, the butterfly, no matter how irregular the course of flight it may pursue, exhibits a strong positive anemotaxis, nearly always alighting on the racemes of its food plant

with its head toward the wind, or at a very slight angle to it. The reason for this is perfectly obvious. It assumes the position in which it offers the least resistance to the wind, in which it needs to exert no muscular effort to keep its wings folded, and in which the muscular effort of flight is exerted symmetrically. Occasionally a butterfly would attempt to turn away from the wind while resting upon the clusters of flowers; but it was unable to maintain this position. The wind would either shift it back again, or blow the wings forward over its head, thus rendering the insect helpless.

On May 12th I was able to observe their flight in the face of a gale. It was a bright, hot afternoon and the wind was blowing at the rate of from 45 to 50 miles per hour. Since *A. olympia* is a weak flier, it could not face a blast like this. The wind swept directly across the crests of the low sand ridges, and the only place that specimens could be found at all was on the leeward sides of the dunes, or immediately behind protecting groups of willows and pines which are often found in the moist depressions between them.

Protected thus from the direct force of the wind, the butterflies were seen pursuing an irregular course, dancing from side to side, but always headed toward the wind, and making slow progress toward the crests of the dunes. This advance was continued until the crest was reached; but no sooner had one reached this point than it was caught in the wind and hurled backward and downward by the eddying blasts, to begin anew the ascent of the leeward slope. This process was observed again and again.

It is not hard to find in this mechanically determined flight a great advantage to the insect. Flight toward the wind tends to keep it within the limits of its habitat. The enforced retrograde movement is counterbalanced by the progress of the butterfly toward the wind. If it flew with the wind, either it would be blown inland, far away from the habitat of its food plant, or it would perish in the waters of Lake Michigan.

The habits described above depend, no doubt, upon structural characters, and do not owe their origin to natural selection; for it is recognized that natural selection can be exer-

cised only upon such structures and habits as already exist. The structural characters which condition the habits may have arisen by mutation or by any other process by which heritable modifications may arise. Having arisen, and being adapted to the needs of the insect, the structures and consequent habits will be preserved by selection. For, if certain specimens by mutation should become still weaker, they might be blown from their restricted habitat, and so perish. If, on the other hand, they should become stronger, so as to attempt to fly with the wind, the same fate would befall them. If the assumptions here made are correct, the habits of the imago are probably preserved by the destruction of those individuals which depart from the most nearly adapted condition.

It is to be hoped that others who live in regions where *Anthocharis olympia* is found will observe the habits and history, and note the variations which a different environment may bring about.

A new Variety of Thecla damon.

By H. H. Brehme, Newark, N. J.

Almost every collector in Newark, and even in New York and Brooklyn, knows, when he wants specimens of *Thecla damon*, to go to Garret mountains at Paterson, N. J., for this species. I have myself collected this insect for a number of years past, and have taken over a thousand examples, mostly of the spring brood, though also some of the summer brood. All of these specimens were of the usual bright fulvous color with dark borders, and none showed any tendency toward a black variety such as is described below. Scudder, in his Butterflies of the Eastern United States and Canada, mentions having a single specimen from Long Island. It is apparently a good variety, there being no intermediates, so I propose the name *patersonia* for it in order that it may be hereafter referred to by name, *Thecla damon* Cram. var *patersonia*, nov. var.

Of the same size as the usual form, upper surface of both pairs of wings even blackish-brown, with a very few scales

scattered over the primaries and several near the anal angle of the secondaries; basal half of inner margin of secondaries paler than rest of wing, beneath as in the normal form. Type: one ♀ from Paterson, N. J., dated July 25, in the collection of the writer.

The specimen was bred by Mr. J. A. Grossbeck from larvæ of the spring brood which were found on red cedar.

Insect Hunting as a Pastime.

By G. A. Akerlind, Chicago, Ill.

Last summer I had occasion to stay in St. Louis, Mo., during the months of August and September, and as I was a stranger in the city, and there was "nothing doing" particularly, I devoted my evenings to insect hunting in the streets, and my Sundays to roam the woods for butterflies and the like. I had previously become interested, through some Chicago friends, in the entomological section of the Academy of Science, but I had not taken up the "sport" in earnest until my St. Louis sojourn, of which I should like to say a few words.

It takes some little experience to appreciate what it means to live in a hotel in the business section of a large city during the hottest season of the year, particularly so if you are not a "traveling man," and therefore pretty certain to have only yourself for a companion. The heat prevents you from pursuing any studies indoors, and out of doors—well, there you are hunted by insects. Consequently, I took up insect hunting as a pastime, but after a few evenings' "work" it became a sport with such pleasant and recreative effect that I am sorry that I did not take it up twenty years ago. In hunting and fishing you are generally confined to certain localities, but in insect hunting during the summer, it is not so, at least not in St. Louis, where the "game" is waiting for you outside your door and even in your bedroom.

Through the kind assistance of an old German jeweler near my hotel I rigged up the necessary killing bottles, and that was the only equipment needed for a start. This venerable Ger-

man, by the way, came to St. Louis in 1856, when that city was the peer of Chicago and believed to be destined to remain so forever, which is very queer to contemplate for a modern Chicagoan. I had observed that the electric lights in front of the large store windows were hung unusually low, about eight feet, and a great abundance there were. This, I figured, would be favorable for bug hunting. The first clear evening I started out on an expedition and had not walked far before I came across a rather large bug sprawling on its back in its efforts to come on right keel. I had before this learned not to fear any bug (except the electric *Belostoma americana*), and I therefore unhesitatingly pounced on this one and had him in the bottle in less time than it takes to tell it. I bottled quite a few that evening, and after a tramp of some four or five miles up and down the streets I retired to my hotel and had a night's solid sleep.

The next morning I was curious to see what I had found during my initial expedition. There were the common large ground beetles and a number of smaller ones, but there was one with an elegant form and a dark blue border around the elytra. This beetle, the *Carabus sylvosus*, we do not have in Chicago, at least I have never found it there, and I felt very much encouraged to continue the hunt. Almost every evening I found something new in the way of insects, besides seeing interesting things that ordinarily escape our notice.

After the day's work in the office I never had to wonder how I would spend the evening. After supper and a perusal of the newspapers I would start out about 8.30 o'clock on my hunt, returning about 10.30 with my "game." This period appeared to be the best, as I seldom found anything before 8.30 or after 10.30. The people on the street did not bother me much. Nobody knew me and I did not know anybody. The policemen appeared to be about as scarce in St. Louis as in Chicago, and if they noticed anything queer about my actions they apparently considered me harmless. But one evening I very nearly got into trouble. As I walked along I perceived on the pavement a moving object in the uncertain light of the reflection from an electric light. "What is that? that is

a funny kind of grasshopper! You must have been too close to that electric light," I thought. In stooping down the "grasshopper" appeared to me to have a strange resemblance to a giraffe, and when I cautiously grabbed for the wings the head was quickly turned around and I received a smart little bite that did not particularly hurt, but which completely took my nerve for the moment. At the same time it aroused my hunting passion to its highest pitch. I fell on my knees, buffeting the fierce little monster with one hand, while I pulled out my handkerchief with the other, and after a great bustle I finally succeeded in getting him securely enveloped.

When I arose there was a crowd standing around, apparently at a loss to make out what was the matter, but as I walked briskly away and probably appeared sane, no one molested me. I went straight to my hotel and put the captive with handkerchief and all in a fruit jar previously loaded for butterfles, and spent the next hour pondering over what kind of an insect I had found. A grasshopper does not turn his neck around and bite, at least not those I have come across, neither does a locust or dragon fly, or anything in that line. Cautiously opening the handkerchief, out fell a beautiful specimen of praying mantis, *Mantis religiosa*,* which I had seen pictured in books, but never found before. That I was proud of this evening's catch goes without saying, and it is also certain that my anticipation for the future was considerably freshened. I did not succeed, however, in encountering any more such lively prey on the pavements of St. Louis, and I will therefore leave the "bugs" for the present and relate something of my butterfly hunting expeditions.

By experience I have learned that a hat is a poor instrument for catching butterflies, and I therefore bought a frame for a landing net in a sporting goods store, and a piece of netting, the name of which I do not know in a dry goods store. Needles and thread have been part of my bachelor equipment for the last quarter of a century, and soon my fly-net was completed. With the assistance of my old German friend I had made a powerful killing bottle of a fruit jar that just

**Stagmomantis carolina.* Eds.

fit into my coat pocket, and Sunday morning, bright and early, I started out on my first trip. Anyone visiting St. Louis in the summertime should not fail to take an electric car ride to Creve Cœur Lake (The Bleeding Heart) about thirty miles from the city. The cars are open, the road absolutely dustless, and the speed up to forty miles an hour.

The double track runs through a most beautiful country, with wooded hills and valleys, fruit gardens and cornfields. Small colonies formed by city people are rapidly growing up along the line, and at the terminal, Creve Cœur Lake, improvements are constantly being made to increase the attractions of the place. The electric road ends on top of a "bluff" about 250 feet, I should judge, above the Creve Cœur Lake. The plateau is only a few acres in extent, but on both sides are other "bluffs" with deep ravines between them and below the lake shore, with all the attractions customary to such a place. The scenery from the bluffs is truly grand and passes my ability to describe. The vegetation is rich and varied. On the bluffs oak, elm, walnut and hickory, and on the bottom land immense cottonwood trees and sycamores. Of weeds and grass there was an abundance, as well as of blackberry bushes and burning nettles; in fact, some parts of the limited area of the woods, I traversed were wellnigh impossible to penetrate. A scaly lime rock formation formed the "bluffs," and towards the lake the rock cropped out, forming walls of considerable height, with water trickling out between the layers forming cascades, or rather suggestions of such. Viewed from the lake the hills had the same appearance as those along the Mississippi River, and it is quite evident that Creve Cœur Lake is formed by the river, and, I was informed, is yet filled to overflowing at times when the river is unusually high.

About 9.30 that beautiful Sunday morning I arrived at my destination, and had hardly ordered my breakfast when a fine ***cresphontes*** came sailing along not ten feet from the table. A hurry-up warning to the waiter was the first effect, and when a few minutes later a beautiful *Papilio ajax* came almost within striking distance I forgot what little I know of table

manners and finished that breakfast in "no time." In a few minutes I was out in the woods with the net ready for action. Ha! There is a *cresphontes,* but how high he flies! and there is the *Papilio ajax,* but how he is diving and criss-crossing! I might as well try to chase a sparrow with my net as that fellow. But watch! He is coming this way! A wild "strike" sent me sprawling in a bed of burning nettles, but what did that matter? In the net was fluttering a real *Papilio ajax,* the first one I had seen at such close quarters, and not willing to take any chances by "bottling" in the usual way, I pressed his thorax between my fingers and then I could plainly feel his heart beat,—or perhaps it was mine! "Unmanly?" Well, yes, perhaps.

A good many things a man does at times can hardly be called "manly" or "noble," but will, nevertheless, make an impression upon his mind more lasting, and I may say, more recreative than "big" deeds, like stopping a runaway horse or licking a tramp.

It is now a year since I caught my first *Papilio ajax* and *cresphontes,* but how many times during this past year have not the incidents been gone through! How vividly have I seen the blue sky, the majestic trees and the many-colored flowers, heard the soft winds, the harmonious songs of the beautiful birds, and above all as centers of attraction, the butterflies, the winged and non-winged creatures that make up the insect world! Is not this true recreation for the business man, the engineer and all "intellectuals" in general, as well as for the man in the humblest calling? It is a happy sign of the time that nature study is coming more and more to the front, and any one who has taken up any branch of this study and pursued it far enough to get a real interest in it, will surely agree with me that it is as healthy and as inspiring a form of recreation and pastime as can be well enjoyed by the average man.

This tale has already grown too long, and I will only mention that Horse Shoe Lake on the Illinois side of the river is another locality near St. Louis worth visiting, besides all those of which I do not know anything. A partial list of specimens I found in St. Louis and vicinity last summer and a few I found

there this summer during a short stay is given below, as determined by my friend, Mr. Emil Lilejeblad, a veteran insect hunter, and will show, I hope, that insect hunting as a pastime is a success, at least in St. Louis.

LIST OF SPECIES TAKEN:

COLEOPTERA.

Cicindela repanda.
" *punctulata.*
" *macra.*
Carabus sylvosus.
Calosoma scrutator.
" *sayi.*
" *callidum.*
Panagaeus fasciatus.
Pterostichus femoralis.
Dicaelus splendidus.
Lebia grandis.
Harpalus vulpeculus.
" *caliginosus.*
Anisodactylus baltimorensis.
Dineutes vittatus.
Hydrocharis obtusatus.
Silpha surinamensis.
Staphylinus maculosus.
Megilla maculata.
Coccinella sanguinea.
Monocrepidius lividus.
Megalodacne fasciata.
Alaus oculatus.
Chauliognathus pennsylvanicus.
Lucanus dama.
" *placidus.*
Canthon chalcites.
Choeridium histeroides.
Copris minutes.
" *anaglypticus.*
Trox capillaris.
Pelidnota punctata.
Ligyrus gibbosus.
Allorhina nitida.
Chrysochus auratus.
Chrysomela costa.
Diabrotica 12 punctata.
Epicauta puncticollis.
Epicauta vittata.
" *cinerea.*
Pyrota engelmanni.

LEPIDOPTERA.

Iphidicles ajax.
Papilio turnus.
" *troilus.*
" *cresphontes.*
Laertias philenor.
Eurema nicippe.
" *lisa.*
Charidryas nycteis.
Phyciodes tharos.
Polygonia comma.
Thymelicus taumas.
Enodia portlandia.
Sphinx plebeja.
Haploa lecontei.
" *militaris.*
Leptarctia lena.
Apantesis virgo.
" *parthenice.*
" *figurata.*
Schinia arcifera.
" *brevis.*
Tarache aprica.
Catocala obscura.
" *palaeogama.*
Eupsyche M-album.
Thecla edwardsii.
Achlarus lycidas.
Thorybes bathyllus.
Pholisora catullus.
" *hayhurstii.*
Hesperia tessellatus.
" *centaureae.*
Hemaris axillaris.
Epimesis virginaria.

Standards of the Number of Eggs Laid by Insects—V.*

Being averages obtained by actual count of the combined eggs from twenty (20) depositions or masses.

By A. Arsene Girault.

6. Stagmomantis carolina Linnaeus.

No.	Date, 1906	No. counted per mass	Successive totals	Av. per egg mass	Max.	Min.	Range	
1	Nov. 25	109	109	109.			115	
2		64	173	86.5				
3		49	222	74.		49		
4		87	309	77.3				
5		82	391	78.2				
6		89	480	80.				
7		91	571	81.6				
8		95	666	85.8				
9		96	762	84.7				
10		100	862	86.2				
11		115	977	88.8	115			
12		105	1012	84.3				
13		93	1105	85.				
14		91	1196	85.4				
15		105	1301	86.7				
16		87	1388	86.8				
17		110	1498	88.1				
18		86	1584	88.				
19		90	1674	88.1				
20		98	1772	88.6			49	
20			1772	88.6	115	49	66	Finals

The egg-masses were collected at Myrtle, Ga., November, 1906, from peach trees. They were found to be freely parasitized by *Podagrion mantis* Ashmead, which was found ovipositing into them during the month of November. Owing to the peculiar construction of the case, in order to count the individual eggs in each, they had to be sectioned longitudinally through the side, and then dried. Some of these sections exposed quite large larvæ of *mantis*, and occasionally living adults. The eggs are quite common in this locality.

Prof. M. J. Elrod of the University of Montana is giving considerable attention to photographing Indians in his part of the world.

* For the first four of this series, see Ent. News, 1901, p. 305; 1904, pp. 2-3; 1905, p. 167; and 1906, p. 6.

Notes on Bombinae, with Descriptions of New Species.

By H. J. FRANKLIN, B. S.

Massachusetts Agricultural College, Amherst, Mass.

Bombus nigrodorsalis n. sp.

♀.—Length, about 19 mm.—Labrum sulcate in the middle. Clypeus rather smooth and shining, very delicately and sparsely punctate over entire surface except the corners. Malar space distinctly longer than it is wide at the apex; about one-third as long as the eye. Third antennal segment somewhat longer than the fifth; fifth distinctly longer than fourth. Ocelli normal and placed near the supraorbital line, above the narrowest part of the front. Hypopygium without median carina. Head with face, occiput and sides behind the eyes all black except for a very slight sprinkling of light hairs, visible with a lens, above the bases of the antennæ. Labrum fringed on free edge with yellowish fulvous hairs.

Thorax with pleura covered with light yellow pile from the tegulæ to the bases of the legs, the yellow on the two pleura being connected by a rather narrow band of the same color which crosses the dorsum of the thorax in front. This yellowish band does not nearly extend back on the middle of the dorsum to even with the tegulæ, but its posterior border is curved forward strongly from them on each side. Metanotum with a mere fringe of yellow pile behind. Otherwise the thoracic dorsum is entirely covered with black pile, there being, however, a very small bare spot on the center of the mesothoracic disc.

Abdomen above with the three basal segments entirely and rather densely covered with bright yellow pile; fourth segment entirely black and bearing black pile; fifth segment clothed with black pile, except its apical margin, which bears dull fulvous hairs; sixth segment dull fulvous and fringed with pile of the same color. Ventral surface of abdomen black toward the base, but with the hair which thinly fringes the apical margins of the second, third and fourth segments light yellow; hair fringing the apical margin of the fifth segment and the entire sixth segment dull fulvous.

Middle and posterior coxæ bearing some yellow hairs. Hind femora entirely black, with no light or yellow pile. Anterior and middle femora and tibiæ all black and without light pile. Some of the hairs fringing the corbiculæ behind tinged with fulvous. Wings somewhat stained with brown.

♂.—Length, about 12½ mm. Like the ♀, except in point of size, but the corbicular fringes are entirely black and the pile of the apical abdominal segment and the apical fringe of the fifth segment are much less strongly fulvous than in the ♀.

Described from one female, and one worker (cotypes) in the collection of the U. S. National Museum. Five female paratypes and one worker paratype are also in that collection.

Subspecies *laticollis*.—♀.—Like the typical *nigrodorsalis* except that the band of yellow pile running across the anterior part of the dorsum of the thorax is much wider and reaches back in the middle to even with the tegulæ. Middle and hind coxæ and bases of posterior femora within bearing considerable yellow pile. Posterior fringes of corbiculæ strongly fulvous.

Described from one female (type) in the collection of the U. S. National Museum.

Specimens collected by C. H. T. Townsend in Meadow Valley head of Rio Piedras Verdes (6 miles south of Colonia Garcia), Sierra Madre of Western Chihuahua, Mexico—about 7,000 ft. alt.

Some of the specimens of this species have the coxæ and posterior femora, as well as the fringes of the corbiculæ, all black. The coxæ of the workers sometimes bear yellow hairs and their corbicular fringes are sometimes tinged with light or fulvous color.

This species may prove to be only a variety of *B. weisi* Friese, which in turn is possibly only a form of *B. ephippiatus* var. *laboriosus* Smith, but, if this is the case, then certainly *laboriosus* Smith and *pulcher* Cresson should not be included as varieties of the same species, as they are listed by Dalla Torre on the authority of Handlirsch. *B. nigrodorsalis* ♀ has a distinctly longer malar space than has *B, pulcher* ♀, and this is an exceedingly constant specific character in *Bombus*.

Bombus haueri Ant. Handlirsch.

♀.—Length, about 23 mm.—Malar space somewhat wider at the apex than it is long. Clypeus rather strongly punctate. Third antennal segment fully as long as the fourth and fifth taken together. Ocelli large, placed below the supraorbital line, in the narrowest part of the front. Hypopygium without median carina. Head with face, occiput and sides behind the eyes all black.

Thorax with anterior part of dorsum and the metanotum densely covered with deep yellow pile. A broad band between the bases of the wings and the pleura from the level of the tegulæ to the bases of

the legs densely black and covered with black pile. The black band between the wings slightly more than one-half as long (from front to rear) as broad (from wing base to wing base). Tegulæ completely surrounded by black pile.

Abdomen above, with the first two segments densely clothed with yellow pile and the remaining segments covered with rich deep fulvous pile. Ventral surface of abdomen black, except toward and at the apex, where the segments are quite heavily fringed, especially on the side margins, with deep fulvous pile. Coxæ, trochanters, femora, and tibiæ all black and bearing no light pile; corbicular fringes black. Tarsi more or less light brown ferruginous. Wings dark, as in *B. crotchii* Cr.

☿.—Length, 17 mm.—Like the ♀, but smaller. Tegulæ not entirely surrounded by black pile, but reached by yellow pile in front. Third antennal segment scarcely equal in length to the fourth and fifth taken together.

♂.—Length. 17½ mm.—Eyes greatly swollen, bulging out from the sides of the head. Ocelli large and placed far below the supraorbital line. Malar space very short, not much longer than the pedicel of the antenna. Antennæ with third segment fully as long as the fifth, the fourth much shorter than either.

Head black, but with face below the bases of the antennæ rather strongly yellow, black hairs, however, being intermixed. Sides of head behind the eyes black. Occiput rather weakly covered with yellow hairs.

Thorax with pleura covered with yellow pile to the bases of the legs. Dorsum of thorax entirely and densely covered with yellow except for a broad but rather indefinite (due to the intermingling of the yellow hairs) black band between the bases of the wings.

Abdomen above with first three segments covered with dull tawny yellow pile. The remaining segments shading off toward the apex of the abdomen into rich fulvous. Abdomen beneath black at base, but, beginning a little behind the middle, the apical margins of the segments are fringed more or less heavily, especially toward the side margins, with fulvous hairs. Coxæ and femora all black. Tibiæ and metatarsi all black, except their points and the inner sides of the metatarsi, which are light brown ferruginous, as are also the remaining segments of the tarsi.

Locality labels of specimens as follows:

Mexico City, 1 ♀; Mexico, 1 ♀; Eslaya, Mexico, 1 ♂; Meadow Valley, Mexico (C. H. T. Townsend, Collector), 1 ☿. The ☿ and ♂ of this species have not been heretofore described. The types (☿ and ♂) are deposited in the col-

lection of the U. S. National Museum. The ♂ type is not in good condition, the pile of the abdomen being matted.

Were I to follow Robertson and recognize the genus *Bombias,* I should include this species under that genus. For certain reasons, which I hope to give in full in a later paper, however, it seems to me that *Bombias* should not be given more than subgeneric rank, though its standing as a good subgenus cannot be questioned.

Bombus handlirschi Friese.—Friese's original description of the worker of this species, translated freely from the Latin, is as follows:

"☿.—Black, for the most part fulvous—or ferruginous—hairy; head short; head and thorax above cinereous—sides ferruginous—hairy; segment 1, ferruginous; 2 and 3, fuscous—or fuliginous—4-6, ferruginous—hairy; wings fuliginous. Length, 13-15 mm."

To aid students of the group in determining this species, I append to this description the following:

Ocelli near the supra-orbital line, above the narrowest part of the front. Clypeus smooth and shining, rather delicately punctate. Malar space distinctly longer than it is wide at the apex, a little more than one-fourth the length of the eye. Third antennal segment somewhat longer than fifth; fifth distinctly longer than fourth. Hypopygium without median carina. Head with face, occiput and sides behind the eyes, as well as the entire dorsum of the thorax, including the metanotum, bearing dark ashen gray pile. Pleura from about the level of the tegulæ to the bases of the legs covered with rather light rusty brown pile. Abdomen above with segments one, four, five and six, covered with pile of about the same color as that covering the pleura; segments two and three, except the very side margins, covered with dark fuliginous pile. Abdomen below rather scantily clothed with light rusty brown pile, as are also the side margins of the second and third dorsal segment. Pile on the leg (except on the anterior tibiæ in front and on their inner sides, where it is fuliginous), including the corbicular fringes, all of the same color as that on the pleura and on the venter of the abdomen. Wings strongly infuscate.

Described from three specimens (workers) from Peru, received from Staudinger; in the collection of the Massachusetts Agricultural College.

Bombus parvulus Fabr. It is doubtful if this species belongs to the *Bombinae*. Is the type in existence?

List of Butterflies of North Carolina.

By C. S. Brimley and Franklin Sherman, Jr.,
Raleigh, N. C.

The records presented in this paper are gathered mainly from the experience of the authors. Mr. Brimley has for many years kept a record of the more common species occurring at Raleigh, and of recent years his list has been extended and kept with even greater care and detail. The notes on seasonal distribution are based mainly on his records, amended to conform to the records obtained in other localities. Mr. Sherman has collected many specimens from widely separated localities throughout the State, and it is mainly from his records that the geographical distribution is given.

Notes on the occurrence of eighty species at Tryon, at the edge of the mountains near the South Carolina line, have been kindly furnished by Mr. W. F. Fiske, Special Agent, Bureau of Entomology, U. S. Department of Agriculture. A list of species known at Cranberry, in the mountains near the Tennessee border (where high mountains furnish a touch of boreal fauna), was published by Dr. Henry Skinner, in Ent. News, March, 1893. Another list for the same locality, by Mr. Lancaster Thomas, appeared in the News for May, 1899. A number of scattered records from various localities are from captures by representatives of the North Carolina Department of Agriculture and from reliable published records.

Our survey of the butterfly fauna of the State is by no means complete. While we believe that we have collected nearly all of the species (one hundred and eleven being here recorded), there are no doubt several, especially among the Hesperidae, which we lack, and extensive collections have been made in so few localities that much is yet to be added to our knowledge of exact distribution. But, as we have both ceased to actively collect these insects, we feel that it is best to publish the list while the records are fresh.

We have here followed the classification of Smith's Check-list of Lepidoptera (1903), and, although we prefer the sepation of the Pierids as a separate family, we believe the sequence

and names here used will at least be more convenient than that given in any other recognized list.

The letters in parentheses after the localities—(C.), (E.), (E.-C.), etc.—refer to the locality in the State, as central, eastern, east-central, etc.

NYMPHALIDAE.

1. *Danais plexippus* Linn. Generally distributed. Late March to end of November.
2. *Agraulis vanillae* Linn. In mountains of western section, especially southward, and at Raleigh (E.-C.) in 1905. Not noted previously.
3. *Euptoieta claudia* Cram. Generally distributed. Middle of July to end of November, sparingly from April to July. Larvae sometimes destructive to violets and pansies.
4. *Argynnis diana* Cram. Principally confined to mountains, but two have been noted at Raleigh (E.-C.). Mid June to September.
5. *Argynnis cybele* Fabr. Common in mountains, sparingly in middle section, and rare at Raleigh. End of May to middle of September.
6. *Argynnis aphrodite* Fabr. Abundant in mountains but not noted elsewhere. June to September.
7. *Argynnis myrina* Cram. "Mountains of North Carolina."—Holland Butterfly Book, pp. 129-130.
8. *Argynnis bellona* Fabr. One taken and two others seen in drive along mountain roads of Watauga Co., near Tennessee line, in late August, 1906.
9. *Melitaea phaeton* Drury. Two localities, both in mountain section; Tryon (SW.) in May and Cranberry (W.) between June and October.
10. *Phyciodes nycteis* Db. and Hew. Three localities, all in mountains—Tryon (SW.), Cranberry (W.), and Blowing Rock (W.). May and June.
11. *Phyciodes tharos* Drury. Generally distributed. From late March to end of November.
12. *Grapta interrogationis* Fabr. Generally distributed. Hibernates. Recorded on wing at Raleigh, every month except December, as late as November 30 and early as January 22.
13. *Grapta comma* Harr. Common in mountains, uncommon at Raleigh, though abundant in fall of 1904. Seasonal range same as preceding, though not so fully recorded.
14. *Grapta faunus* Edw. Two localities, both in mountains. Cranberry (W.) and Blowing Rock (W.) (elevation, 4000 ft.). Common July to September. A strictly mountain species.

15. *Grapta progne* Cram. Cranberry (W.). ENT. NEWS. May, 1899.
16. *Vanessa antiopa* Linn. Occurs at Raleigh in February, March, and April, and in September and October. Also taken in several western localities in mountains at same seasons, and also in August.
17. *Pyrameis atalanta* Linn. Generally distributed. Early April to end of November.
18. *Pyrameis huntera* Fabr. Generally distributed. Common from end of March to end of November.
19. *Pyrameis cardui* Linn. Generally distributed. Not observed all years. At Raleigh common, '03 and '05; not observed other years. One at Faison (E.), October, 1900; Cranberry (W.), 1899; at Tryon (SW.) and Brevard (SW.) in 1904; common at latter place.
20. *Junonia coenia* Hbn. Generally distributed. End of March to end of November; common; abundant latter part of season.
21. *Limenitis ursula* Fabr. Recorded in middle and western sections; At Raleigh early May to middle of October.
22. *Limenitis archippus* Cram. Generally distributed. At Raleigh in early May and from early July to middle of October.
23. *Apatura celtis* Bd. and Lec. Recorded from only two points,—Smithfield (E.-C.), July, 1903, and Bushnell (W.), September, 1904.
24. *Apatura clyton* Bd and Lec. One at Raleigh, 1896.
25. *Debis portlandia* Fabr. Generally distributed. End of May to end of October.
26. *Neonympha canthus* Bd. and Lec. Cranberry (W.) (ENT. NEWS, March, 1893).
27. *Neonympha gemma* Hbn. Raleigh (E.-C.) and Tryon (SW.). End of March to end of October.
28. *Neonympha phocion* Fabr. Recorded from eastern and middle sections of State. End of May to end of September.
29. *Neonympha eurytris* Fabr. Generally distributed. At Raleigh from early May to early July, but taken September 1st at Bushnell (W.) in the mountains.
30. *Neonympha sosybius* Fabr. Recorded from edge of mountains eastward. Early April to early October.
31. *Satyrus pegala* Fabr. To this species we refer a number of our eastern specimens on account of their large size and the absence or rudimentary condition of the eye.spot in the males. At Raleigh from July 1st to October 1st.
32. *Satyrus alope* Fabr. To this species we refer a smaller form taken in the mountains in July and August.

LIBYTHEIDAE.

33. *Libythea carinenta*, var. *bachmani* Kirtl. Rare at Raleigh in April and May. One at Highlands (W.) in mountains in September, 1906.

ERYCINIDAE.

34. *Calephelis caenius* Linn. Fayetteville (E.), July, 1903.

LYCAENIDAE.

35. *Thecla halesus* Cram. Tryon (SW.), May; Lumberton (SE.), September; Wallace (SE.), March.
36. *Thecla m-album* Bd. and Lec. Three localities, all in mountains, April and August.
37. *Thecla melinus* Hbn. Generally distributed. End of March to end of October.
38. *Thecla edwardsi* Saund. Tryon (SW.), July.
39. *Thecla calanus* Hbn. Tryon and Cranberry; June, July.
40. *Thecla damon* Cram. Several localities, from edge of mountains eastward. End of March to middle of August. Never common.
41. *Thecla cecrops* Fabr. Generally distributed; common at times, but seemingly rare at Raleigh. Early April to early September.
42. *Thecla augustus* Kirby. Tryon (SW.). Middle of March to late May.
43. *Thecla irus* Godt. Raleigh and Tryon. April and May.
44. *Thecla niphon* Hbn. Three localities, from edge of mountains eastward. Middle of March to end of June.
45 *Thecla titus* Fabr. Raleigh and Tryon; one record each. June and July.
46. *Feniseca tarquinius* Fabr. Four localities, from mountains to east-middle section. May, June, and October.
47. *Chrysophanus hypophlaeas* Bdv. Many localities, from east-central section westward. Late March to late November.
48. *Lycaena pseudargiolus* Bd. and Lec. Generally distributed. Middle of March to early October.
49. *Lycaena comyntas* Godt. Generally distributed. Late March to middle of November.

PAPILIONIDAE.

50. *Pieris protodice* Bd. and Lec. Generally distributed. Middle of March to end of November. Not common at Raleigh.
51. *Pieris rapae* Linn. Generally distributed. Early March to end of November. A pest.
52. *Anthocharis genutia* Fabr. Raleigh and another central locality. End of March to late April.
53. *Catopsilia eubule* Linn. Generally distributed. Early April to middle of November, but with a season in summer when none are taken; much more common in late fall.
54. *Colias caesonia* Stoll. Generally distributed. Has been common at Southern Pines (E.-C.); rare at Raleigh and in the mountains (W.). March, April, July, August, October, and November.
55. *Colias eurytheme* Bdv. From Raleigh (E.-C.) westward. End of March to end of October.

56. *Colias philodice* Godt. Generally distributed; abundant in mountains. March to November.
57. *Terias nicippe* Cram. Generally distributed. Early March to late October.
58. *Terias lisa* Bdv. Generally distributed; less common in high mountains. Middle of June to end of November. One at Raleigh in early April.
59. *Terias delia* Cram. Three localities, from Raleigh (E.-C.) westward. At Raleigh, middle of September to middle of October. At Tryon, April 3d and July 1st. At Raleigh this species is not noted every year.
60. *Terias jucunda* Bd. and Lec. Generally distributed. At Raleigh, middle of August to early October. Like *delia* it is absent some years. At Tryon, observed in late March and early April.
61. *Papilio ajax* Linn. General from edge of mountains eastward. Late March to late August.
62. *Papilio philenor* Linn. General from Raleigh westward; much more abundant in the mountains. Early April to late September. Larva a pest on Dutchman's pipe in ornamental nursery in mountains.
63. *Papilio polyxenes* Fabr. Generally distributed. Late March to end of October.
64. *Papilio troilus* Linn. Generally distributed. Late March to middle of September.
65. *Papilio palamedes* Dru. Common in southeastern section. April to July. Not observed at Raleigh.
66. *Papilio glaucus* Linn. Generally distributed. Late March to middle of September.
67. *Papilio thoas* Linn. In extreme southwest in mountains and along coast. Not taken at Raleigh. June and August.

HESPERIDAE.

In this family the collections are so scattered that the distribution is not well shown; hence, we usually indicate the few localities in which each species has been taken.

68. *Ancyloxypha numitor* Fabr. Generally distributed. Middle of May to end of September.
69. *Pamphila zabulon* Bd. and Lec. Generally distributed. Late April to middle of September.
70. *Pamphila hobomok* Harr. Blowing Rock (W. mountains), August, 1901.
71. *Pamphila metea* Scud. Raleigh (E.-C.) and Tryon (SW.), April and March.
72. *Pamphila attalus* Edw. "NC" (Skinner, Cat. of N. A. Rhop.); aiso Edwards (Trans. Am. Ent. Soc., vol. xi, p. 310, as *seminole*.

73. *Pamphila campestris* Bd. Generally distributed. May to middle of November.
74. *Pamphila phylaeus* Drury. Generally distributed. Early August to end of November.
75. *Pamphila brettus* Bd. and Lec. Raleigh and Beaufort (on coast). Early August to early October.
76. *Pamphila otho* Sm. and Abb. Generally distributed. Early August to early September.
77. *Pamphila peckius* Kirby. Several western (mountain) localities. May and August.
78. *Pamphila manataaqua* Scud. Raleigh (E.-C.), Tryon (SW.), Cranberry (W.). Middle of May to middle of August.
79. *Pamphila cernes* Bd. and Lec. Raleigh, Tryon, Blowing Rock. Middle of May to middle of August.
80. *Pamphila verna* Edw. Raleigh, Cranberry. July and August.
81. *Pamphila metacomet* Harr. Raleigh. August. Rare.
82. *Pamphila accius* Sm. and Abb. Generally distributed. Late June to end of November.
83. *Pamphila loammi* Whit. Same references as for *P. attalus*.
84. *Pamphila panoquin* Scud. Beaufort (on coast), June, 1903. Abundant.
85. *Pamphila ocola* Edw. Raleigh and Beaufort. Middle of June to late October.
86. *Pamphila yehl* Skinner. Washington (on coast), July, 1903.
87. *Pamphila vitellius* Fabr. Raleigh, Tryon. June, July, and August.
88. *Pamphila fusca* G. and R. Raleigh, Tryon, Cranberry. May, June, and July.
89. *Pamphila hianna* Scud. Raleigh and Tryon. May.
90. *Pamphila carolina* Skinner. This species, described from this State, has never yet to our knowledge been recorded from any point outside the State. Described from Hamlet (E.-C.). Raleigh, late March; Lumberton, April. One at Raleigh, August 24, 1903.
91. *Amblyscirtes vialis* Edw. Generally distributed. Middle of April to middle of September.
92. *Amblyscirtes samoset* Scud. Tryon, May 28, 1904. Only record.
93. *Amblyscirtes textor* Edw. From mountains eastward. April, July, August, and September.
94. *Pyrgus tessellata* Scud. Generally distributed. April to end of November.
95. *Pyrgus centaureae* Ramb. Tryon (SW.), Montvale (SW.). April.
96. *Nisoniades brizo* Bd. and Lec. Raleigh. Late March and April.
97. *Nisoniades icelus* Lint. Tryon. April.
98. *Nisoniades lucilius* Lint. Raleigh. May.
99. *Nisoniades persius* Scud. Tryon. May.
100. *Nisoniades martialis* Scud. Raleigh (E.-C.), Southern Pines (SE.), Tryon (SW.). April, July, and August.

101. *Nisoniades juvenalis* Fabr. Raleigh, Tryon, Cranberry. March' April, and August.
102. *Nisoniades petronius* Lint. Cranberry, between June and October.
103. *Nisoniades naevius* Lint. Raleigh. May 26, 1906.
104. *Pholisora catullus* Fabr. Generally distributed. Early March to early September.
105. *Pholisora hayhursti* Edw. Beaufort (on coast). June 24, 1903. Common.
106. *Eudamus pylades* Scud. Generally distributed. Middle of April to early August.
107. *Eudamus bathyllus* Sm. and Abb. Generally distributed. Late March to early September.
108. *Eudamus lycidas* Sm. and Abb. Raleigh, Tryon, Cranberry. May, June, and August.
109. *Eudamus cellus* Bd. and Lec. Tryon. May, June, and July.
110. *Eudamus tityrus* Fabr. Generally distributed. Late March to early October.
111. *Eudamus proteus* Linn. Wilmington (extreme SE.), Raleigh, Tryon. July, September, and October. Seemingly rare.

A New Ant Lion-fly from Arizona.

By Nathan Banks.

During the past few years the described species of American Myrmeleonidæ have nearly doubled. The greater part of the increase, however, has been in one genus—*Brachynemurus*. The species I now add belongs to the genus *Glenurus*, of which there was previously but one species,—*G. grata*,—a large and handsome form from Florida, and some points on the Gulf Coast.

I dedicate this new species to its collector, Dr. Snow, whose energy and perseverance have made the collection of insects of the University of Kansas one of the great collections of the country.

Glenurus snowii n. sp.

Face black in middle, yellow on sides and under the eyes, black above antennæ; vertex pale with black marks, a transverse line from eye to eye, a median stripe widened in front and divided behind, and a black spot in the yellow each side near eye; antennæ yellowish-brown, basal joint partly black; palpi black, basal joints mostly yellowish; pronotum dull black, with a narrow median yellow stripe and a short indistinct yellowish streak in each side; rest of thorax black, with a median yellow

line throughout posterior margin of mesoscutellum, a transverse line connecting lateral lobes and an elongate spot each side near middle, yellow; apex of metascutellum and a spot on each side lobe are yellow; abdomen black, a minute yellow spot on middle at base of segments 4 and 5; 6, 7, and 8 faintly yellow on the posterior margin. Wings hyaline; hindwings with a large black apical mark, much like that of *G. gratus*, but its inner margin is irregular and prolonged on middle, and leaves three pale spots, the apical one containing a minute dark dot. Between the subcosta and radius is a series of black spots nearly reaching to base of wing, and the longitudinal veins are marked interruptedly with black. The forewings are marked all over with black spots; the posterior apical margin is faintly black, and there are two large irregular subapical spots connected together, and a large spot on the middle of the posterior margin. There is a series of spots, more or less connected, between the subcosta and radius, also between median and cubital veins, several on the posterior margin and many small ones elsewhere on the wings, especially beyond the large subapical spots. Nearly all of the veins are marked with black, the cross-veins mostly in the middle.

There are 7 cross-veins before origin of the radial sector in the forewings, only 1 in the hindwings; about 12 branches to the radial sector in the forewings.

Expanse 74 mm.

One specimen from the Baboquivari Mountains, Arizona (Snow). Professor Snow informs me that he has another specimen.

Discovery of Blood-sucking Psychodidae in America.

By D. W. Coquillett.

Among the members of the family Psychodidæ the genus *Flebotomus* (or *Phlebotomus*, as it has been unwarrantedly amended) is the only one known to partake of the blood of man and other animals after the manner of mosquitoes. Up to the present time this genus has been recorded only from the southern part of Europe. Its occurrence on the western continent is now herewith recorded for the first time. In the summer of 1905 Mr. H. S. Barber captured two specimens of an undescribed species on Plummer's Island, Maryland, and in the following year Messrs. Barber and E. A. Schwarz collected specimens of a second species in Guatemala, in both of which localities the blood-sucking propensities of the females were fully demonstrated. Both of these species differ from

the published figures of the European *F. papatassii* (Loew, Ent. Zeit. Stettin, v, tab. 1, fig. 5, and Van der Wulp, Dipt. Neer., pl. ix, fig. 10) in that the first vein of the wings, instead of terminating opposite the proximal end of the first submarginal cell, is prolonged to a point opposite about one-fifth of the length of this cell. The male of only one of our species is at present known, and in this the horny terminal portion of the claspers is different from, though on the same plan, as in the two European species as figured by Rondani (Ann. Soc. Ent., France, 1843, pl. x, figs. 2 and 5).

Flebotomus vexator n. sp.

Yellow, the mesonotum brown, hairs chiefly brown; legs in certain lights appear brown, but are covered with a white-tomentum; wings hyaline, unmarked; the first vein terminates opposite one-fifth of the length of the first submarginal cell; this cell is slightly over twice as long as its petiole; terminal, horny portion of male claspers slender, bearing many long hairs; the apex terminated by two curved spines which are more than one-half as long as the preceding part, and just in front of these are two similar spines, while near the middle of the length of this portion is a fifth spine similar to the others. Length 1.5 mm.

Plummer's Island, Maryland. One male and four females, collected June 23 and July 13, 1905, and July 13, 17, and 29, 1906, by Messrs. H. S. Barber and E. A. Schwarz. Type No. 10,154, U. S. Nat. Mus.

Flebotomus cruciatus n. sp.

Same as *vexator*, except that the hairs are chiefly yellow and the first submarginal cell is about three times as long as its petiole. Male unknown.

Cacao, Trece Aguas, Alta Vera Paz, Guatemala. Five females, collected April 2, 15, 18, and 26, 1906, by Messrs. H. S. Barber and E. A. Schwarz. Type No. 10,155, U. S. Nat. Mus.

AS SEEN IN THE PARK.—A Boston gentleman and his small grandson were in an electric car one day when a young man with a black band on his sleeve got in. The little boy looked at it and then said, "Grandpa, why does he have that on his sleeve?"

His grandfather replied, "Because he has lost some relative. It is called a 'sorry rag.'"

"Oh," said the boy, "I thought it was to keep the caterpillars from crawling up!"—*Magazine.*

Check-List of North American Diptera Pupipara.

By Dr. P. Speiser, Zoppot, Germany.

Note.—Dr. Speiser sent me the following to be inserted in a supplement to my Catalogue. Not contemplating a supplement in this form, I publish it by itself, as it contains the latest views of the chief authority in this group, with some important synonymy. References are given where not found in my Catalogue.—J. M. Aldrich.

HIPPOBOSCIDAE.

Hippobosca L.
equina L.
Melophagus Latr.
ovinus L.
Lipoptena Nitsch.
depressa Say (*mazamae* Rond.). Syn. by Speiser, Ann. Mus. Genova, 1904, 334.
var. *mexicana* Towns.
Ornithoica. Rond.
confluenta Say (*vicina* Walk.).
Ornithomyia Latr.
avicularia L.
butalis Coq. (This is, I believe, but a synonym of the foregoing species.)
anchineuria Speiser, Zeitsch. f. Hym. u. Dipt., 1905, 348 (*pallida* Say, preoccupied).
varipes Walk.
pilosula Wulp. Note.—Austen has mistaken my genus *Ornitheza*, which is palaearcto-indoaustralian.
Ornithoctona Speiser.
fusciventris Wied.
erythrocephala Leach.
bellardiana Rond.
haitensis Bigot.
?*nebulosa* Say.
Ornithopertha Speiser.
nitens Bigot.
geniculata Bigot, Humming Bird, ii, 49. Central America, Speiser, Ann. Mus. Hungar., 1904, ii, 393.
anthracina Speiser, Ann. Mus. Hungar., 1904, ii, 393.—Honduras.
Stilbometopa Coq.
fulvifrons Walk.
impressa Bigot.

Olfersia Leach.
americana Leach.
pallidilabris Rond.
intertropica Walk.
propinqua Walk.
ardeae Macq.
albipennis Say.
angustifrons Wulp.
? *villadae* Dugés.
? *fuscipennis* Macq.
? *obliquinervis* Rond. Note.—The last three may belong to *Pseudolfersia*.
Pseudolfersia Coq.
fumipennis Sahlberg, Medd. Soc. Fauna Fenn., v, 13, 1886, p. 150. (*maculata* Coq. Syn unpublished).
sordida Bigot.
coriacea Wulp.
vulturis Wulp.
spinifera Leach.
var. *sulcifrons* Thoms.
mexicana Macq.
Lynchia (Wyenb.) Speiser.
pusilla Speiser
? *brunnea* Oliv. Cf. Speiser, Ann. Mus. Hungar., ii, 388.
Brachyplomyia Williston.
fimbriata Waterhouse, Proc. Zool. Soc., Lond., 1887, 164. (*femorata* Williston.)

STREBLIDAE.

Subfamily NYCTERIBOSCINAE.

Trichobius (Gervais) Towns.
parasiticus Gervais, Atlas de Zoologie, 1844, p. 14. (*dugesii* Towns.)
major Coq.
Aspidoptera Coq. (*Lepopteryx* Speiser, Arch. Naturgesch., 1900, 53.)
phyllostomatis Perty, Delectus animalium, etc., 1830, 190, pl. xxxvii, fig. 16 (*Lipoptena*).
(*buscki* Coq.). Syn. by Speiser, Arch. Naturgesch., 1900, 53.
Pterellipsis Coq.
aranea Coq. (*Megistopoda desiderata* Speiser, Arch. Naturgesch., 1900, 57, pl. iii, f. 6.) Syn. in Zoolog. Anzeig., xxiii, 154, 1900, with preceding.
Megistopoda Macq.
pilatei Macq.

Subfamily STREBLINAE.

Strebla Wied.
wiedemanni Kolenati, Die Parasiten der Chiropteren, 1856, 46.
(*vespertilionis* Fabricius, 1895, nec. Nitsch, 1803.)
(*mexicana* Rond.)
avium Macq.

NYCTERIBIIDAE.

Penicillidia Kolenati.
mexicana Bigot.
Nycteribia Latr.
antrozoi Towns.

ADDITIONAL NAMES of persons willing to identify certain insects (see February NEWS, page 59):*

Mr. C. T. Brues, Public Museum, Milwaukee, Wis., Parasitic Hymenoptera and Phoridæ.

Mr. August Busck, U. S. National Museum, Washington, D. C., Micro-Lepidoptera.

Mr. Nathan Banks, East Falls Church, Va., Neuropteroid Insects,—all groups except Odonata.

Prof. W. M. Wheeler, American Museum of Natural History, New York, Formicidæ.

Mr. Frank Haimbach, 150 Sumac Street, Philadelphia, Pyralidæ.

Dr. E. Bergroth, 7 West Superior Street, Duluth, Minn., Exotic Hemiptera-Heteroptera, North American Tipulidae.

Prof. C. F. Adams, Fayetteville, Ark., Diptera, especially Oscinidae.

John A. Grossbeck, 337 Suydam Street, New Brunswick, New Jersey, Geometridae.

Dr. H. T. Fernald, Amherst, Mass., Sphecidae of all America.

Mr. E. A. Back, Amherst, Mass., Asilidae.

Mr. H. J. Franklin, Amherst, Mass., Bombinae.

Mr. H. M. Russell, Amherst, Mass., Ophionini.

Mr. A. H. Armstrong, Amherst, Mass., Ceropalidae.

Dr. A. Fenyes, Pasadena, Cal., Aleocharinae of the world.

J. R. de la Torre Bueno, 25 Broad St., New York, Aquatic Hemiptera (except Corixidae).

THE expedition of the California Academy of Sciences to the Galapagos Islands has returned. Many of the coast islands were also visited. An immense series of specimens, both botanical and zoological, were secured. The two entomologists of the party were Mr. F. X. Williams, of Leland Stanford, Jr., University, and Mr. J. S. Hunter, formerly of the University of California. Mr. Hunter, however, devoted most of his attention to birds and mammals.

* It will be best to write to these gentlemen before sending insects.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., MARCH, 1907.

THERE are certain sources of error in describing new species about which we are requested to speak. These errors are brought about by two conditions that are not unusual. It should not be forgotten that species that run out in a poor table are not necessarily new. In groups that are little known and complex, and where there are many species and where the group has not been monographed, it takes a good working knowledge of all the species described before it is safe to declare that any species is really new to science. Of course it is a good thing to have tables, but it is bad to rely on them to the exclusion of a more accurate knowledge. Synonymy is an evil unless the synonym has been well described or accurately figured. It is certainly an evil to be too much in haste in describing new forms, or to describe species (so called) that are so close to known species that the differences cannot be adequately made out by word descriptions.

PROGRESS OF THE "BIOLOGIA CENTRALI AMERICANA."—With the publication of Part CXCIII, in October, 1906, this work has made the following advances as compared with our account given in the NEWS for December, 1905: Coleoptera, vol. IV, part 4 (Rhynchophora, part), by G. C. Champion, has been completed, and, with parts 3, 5, and 6, by D. Sharp, G. C. Champion, W. F. H. Blandford, and K. Jordan, in course of publication, this group of beetles is now represented by 1376 pages and 59 plates. The Odonata, by P. P. Calvert, have reached page 268 and plate viii. Vol. II of the Orthoptera, by L. Bruner and A. P. Morse, has attained page 208 and plate ii.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

BRIEF NOTES ON THE HABITS OF *Podagrion mantis* ASHMEAD.--During April and May, 1906, these parasites began to emerge in numbers from a lot of egg-masses of *Stagmomantis carolina* Linnaeus, collected in the late winter of the same year from various fruit trees. The period of emergence covered a month or more, and the parasites appeared to be in various stages of post-embryonic development at the time they were collected. After all of them had emerged, all traces of them were lost until the following November, when the egg-masses of the mantids were again available as hosts. How the period intervening between their emergence in the spring and the deposition of their known host eggs the following fall is passed remains obscure. In November many of the recently deposited egg-masses of *carolina* were examined, with the result that the parasites were again present within them in both adult and larval stages, the former apparently about to emerge. Each larva occupied and completely filled, when full grown, an individual egg in the pod. On November 26, 1906, a female was found ovipositing. Thus this fall generation is mixed, but the majority of the brood seem to pass the winter to emerge as adults in the spring of the next year.

From 10 egg-masses of the mantid there were reared 578 *carolina*, 240 *Podagrion*, and 12 hyperparasites, making a total of 830 individuals reared, with an average of about 83 to the egg-pod. Including the 12 hyperparasites, making a total fatality in *carolina* of 252, the percentage of parasitism by *Podagrion* is 30.4 per cent., which seems to be a fair average.

The method of oviposition in *Podagrion* is not unusual, but interesting because of the slenderness and length of the ovipositor. The process takes some minutes, but I was unable to obtain actual records. When the ovipositor has been pressed into the host for its entire length the tips of the valves remain applied to the point of insertion, while they themselves bend caudad more and more as the ovipositor is thus pressed into the egg-pod for all of its great length, until at last they extend far beyond the body in the shape of a long-armed letter U. This gives the insect a very peculiar and almost grotesque appearance.

This insect also feigns death like the curculios. When roughly disturbed I have seen them roll over on their side, fold the legs and antennæ against the body, and in this position remain motionless and stiff for two to five seconds, and then quickly regain their feet.—A. ARSENE GIRAULT, Myrtle, Ga.

RARE BUTTERFLIES.—The question "Which is the rarest butterfly in North America?" to which three pages were devoted in the January ENTOMOLOGICAL NEWS, is not one that would be asked by a scientist, but is such a one as I have sometimes been asked by people who neither knew nor cared anything about entomology, but thought it necessary to

try to converse with me upon a subject in which they knew I was interested. Such a question would be foolish unless with the implied qualification "so far as known," and would probably be intended to apply to butterflies in nature rather than in collections, though most people would very naturally suppose that the two conditions would go together.

It could also only properly apply to a species, and not merely to an aberration; nor would it be reasonable to apply it to a species of which only one specimen might have been taken north of the Mexican boundary though abundant south of it.

Limited in that way, I would submit that there is no answer, as there is no one species which could be so designated, as there are several apparently valid species which are known only from a single type.

If, however, one were asked to make choice among these one might, perhaps not unjustly, award the palm of rarity to a species known from a single type, taken many years ago in a well-worked district, in which case it would probably go either to *Eudamus electra* Lint, known only from the type in the Edwards' collection, and which was caught at Hamilton, Ont., in 1877, by the late Mr. J. Alston Moffat, or to *Ancyloxypha longleyi*, as referred to by Dr. Skinner. I have seen the former specimen and it is certainly most interesting, but Dr. Holland, in whose possession it now is, suggested that it might be an exotic species which had been brought to Hamilton in the pupal stage with some plant. That certainly should be investigated by comparison with the British Museum collection.

As to which obtainable butterfly is confined, so far as known, to the smallest geographical area and produces the least number of individuals, I would hardly like to hazard an opinion unless reference is intended to *Argynnis atossa*.—H. H. Lyman.

Hibernation of Coleoptera.—On December 22d a workman brought me two fine live specimens of *Cotalpa lanigera* L., and on January 2d another specimen of same species, and also one of *Balboceras farctus* Fabr., and one of *Lachnosterna* sp. They were found buried four feet deep in sandy soil, which was being excavated in search of moulding sand. The interest in the "find" consists in the fact that the fresh, perfect condition of the specimens indicated that they had completed their metamorphosis and assumed the imago form late this fall, and were evidently hibernating through the winter before emerging from the ground. The elytra of the *C. lanigera* were firm and hard, but a delicate creamy color, not darkened by exposure nor marred by any scratches, and consequently the insects could not have burrowed at all since entering the imago stage of their existence. The fact seems worthy of record.—William A. Nason, Algonquin, Ill.

Cicada septendecim.—I thought perhaps it would be of some interest to you to hear the result of our fight against this destroyer of young trees.

We had a block of peaches on the edge of the woods. We made up our minds two weeks ago that something would have to be done or we would lose the greater part of them. As there were 240,000 trees in the

field we felt that we must make some effort to save all we could. We therefore, two weeks ago, put seven men in that field and have kept them there ever since. I asked the man who had charge of them one day last week how many he thought they would kill in a day. He said he did not know, but it would run up in the thousands. I then asked him to keep an account the next day of how many he killed. He reported at night 1200, and said he was sure that the seven men would average 1000 apiece. On this basis we have calculated that in that field alone by this time we have killed 70,000 locusts, and have had some men in a smaller field, so we feel we are not exaggerating when we say that we have killed 100,000 so far in the last two weeks. There are fewer of them the last day or two, and we hope their season of damage is about over.

We had the men count every twentieth row in the field mentioned above of the damaged trees, and on striking an average on the whole lot from the seven rows counted we make our loss over 12,000 in that field alone. —ABNER HOOPES, West Chester, Pa., June 18, 1902.

THE temporary home of the California Academy of Sciences is at 1812 Gough Street, San Francisco. The second series of informal talks upon the Academy's recent Galapagos expedition was given by Mr. Francis X. Williams, entomologist to the expedition.

MR. J. A. G. REHN has recently completed an important paper on Arizona Orthoptera which has been presented to the Academy of Natural Sciences of Philadelphia for publication. The material was collected by Dr. Henry Skinner, Dr. F. A. Snow, Mr. Charles Schaeffer, and Mr. C. R. Biederman.

EXPLAINED.—A friend from the North had gone to visit the colonel, who lived in the swampy Mississippi River bottoms of Louisiana. There was no mosquito netting over the bed, and in the morning when the negro came with the water and towels the tortured visitor asked:

"Sam, why is it that you have no mosquito netting over the beds? Doesn't the colonel have any in his room?"

"No, suh," replied Sam.

"I don't see how he stands it," exclaimed the visitor.

"Well, suh," drawled Sam, "I reckon it's jes dis way: In de fo' part uv the night, suh, de colonel's mos' gen'rally so 'toxicated dat he don't pay no 'tention to de skeeters, an' in de las' part uv de night, suh, de skeeters is mos' gen'rally so 'toxicated dat dey dou't pay no 'tention to de colonel."—*Newspaper.*

TETYRA BIPUNCTATA H. S.—Mr. E. Daecke's note before the American Entomological Society (ENTOMOLOGICAL NEWS, January, 1907, vol. xviii, No. 1, p. 32) on this rare hemipteron is of interest, as he mentions a new locality. It is not, however, the first record of the family, nor of the species. It was recorded as occurring in Lakehurst, N. J., some distance further north, in the Journal of the New York Entomological Society for

March, 1905, vol. xiii, No. 1, p. 30, where it is stated that it is found not infrequently in that locality, and is ordinarily taken by beating the pines. Of the two specimens I secured there in May, 1904, one was found dead and dry in a bare, sandy spot, and the other on its back, living and vigorously kicking, in a dusty footpath. Mr. William T. Davis has several of these bugs in his collection and so has Mr. H. G. Barber, all taken in Lakehurst.—J. R. DE LA TORRE BUENO.

BUG HUNTING.—This branch of sport, although extensively indulged in, is seldom enjoyed by the hunter. The dismal hour of midnight is the recognised time for successful bug-hunting in the temperate latitudes.

Bugs will lure at most anything, but a hired girl or a schoolma'am is universally believed to be the most killing bait. Bugs have been known to turn up their noses in disgust at a big, sunburnt farm-hand, and then climb three flights of stairs and squeeze through the keyhole to taste the schoolma'ma. However, even the ordinary lank layman may get a few strikes by carefully selecting his place and time. A combination never known to fail is the bridal chamber of a cheap hotel on a Winter night. The necessary paraphernalia consists of a candle, matches and a paper of pins. Having arranged your outfit, retire as quitely as possible, so as not to frighten the wary game, close your eyes and await results.

If you are lucky, but a short time will elapse before you detect a nibble. At such a moment exercise rigid caution; a sudden movement might cause the game to flee. Keeping the body perfectly motionless, reach out and light the candle, at the same time seizing a pin firmly between the thumb and first finger of the right hand. Inhale deeply. This keeps your pulse regular and throws the game off its guard. By this time you have accurately located the point of contrast, and with a sudden movement, you bring it to view. Immediately the game begins a wild scramble for its native jungle, and here is where the sure eye and the strong arm do their noblest work. Having impaled the quarry, insert the pin in the wallpaper at the side of the bed, where the victim expires.

An active, patient man will make quite a catch in a night if his pins hold out. It requires a week's stay, as a rule, to secure enough for a mess, but the effort will be repaid. Men who make a large kill usually grade their game according to size on cards made for the purpose, and present them to the landlady as a mark of affection. She makes a few well-chosen remarks, the hunter hastily collects his luggage, signals the 'bus, and is off to the other fields of fortune.—BY NORMAN H. CROWELL, in Field and Stream.

Doings of Societies.

At the meeting of the Feldman Collecting Social, held on January 16, 1907, at the residence of H. W. Wenzel, 1523 South Thirteenth Street, there were seven members present.

The death, on December 28, 1906, of our fellow member, Mr. Frank Hoyer, was announced.

The President read his annual address.

The following officers were elected to serve for the year 1907: E. Daecke, President; H. S. Harbeck, Vice-President; Frank Haimbach, Secretary; H. W. Wenzel, Treasurer.

FRANK HAIMBACH.

The monthly meeting of the Newark Entomological Society was held January 12th, 1907, in Turn Hall, 184 William Street, Newark, President Dickerson in the chair and thirteen members present. Mr. Frederick Lemmer, of Irvington, was elected to membership, and the topic of willow insects was then discussed.

Prof. Wormsbacher enumerated twenty-eight species of Lepidoptera which he had bred on willow and poplar, among the more rare forms being *Sphinx luscitiosa, Ecpantheria deflorata, Raphia frater* and *Tolype velleda,* this latter, perhaps, recorded from willow for the first time. Mr. Dickerson gave an account of the insects of economic importance, which occur on the willow, and stated that *Cryptorhynchus lapathi* was not destructive to willow and poplar nursery stock in New Jersey. Mr. Bischoff remarked that one hundred or more larvæ of *C. lapathi* may be found tunneling in a few feet of willow branch, and that they were becoming more abundant of recent years at Irvington. Mr. Grossbeck spoke of five species of Sesiids which bore into willow, and stated that he had found old borings in the canes of that plant at Paterson, which were probably those of *Sesia bolteri.* Both Mr. Brehme and Mr. Angleman said they had bred *Sanninoidea exitiosa* from willow, which appears to be a new plant for this species. *Limenitis ursula* was also reported by three different persons as being found on willow and poplar.

Prof. Wormsbacher reported the following rare species of Lepidoptera which he had taken the past summer: *Haploa triangularis,* Hasbrook Heights; *Acronycta hastulifera,* Palisade Park, larvæ abundant on alder; *Feltia volubilis,* Fort Lee, May 30; *Bellura gortynides,* New Durham, August 19; *Plusia*

ou, Rutherford, September 3; *Eosphoropteryx thyatiroides,* Carlstadt, August 11; *Phaeocyma lunifera,* Guttenberg, October 4; *Packardia elegans,* Fort Lee, larvæ common on *Arburnum; Schizura eximia,* Hasbrook Heights, August 3.

He also furnished a note relating his experience with several species of Sphingids which had emerged from their pupæ in a crippled condition, and after remaining so for a day were sprinkled with water, which brought about their full development. The experiment was tried repeatedly, and in all, save one or two instances, with perfect results.

JOHN A. GROSSBECK, *Secretary.*

OBITUARY.

It was with great regret that we learned of the death of Frank Hoyer, for a number of years a member of the Feldman Collecting Social of Philadelphia.

WE regret to announce the death of C. B. Simpson, who has been for nearly three years Entomologist of the Transvaal. He was a graduate of the University of Idaho in 1898; studied nearly three years at Cornell after that; did field work for the Bureau of Entomology in South Idaho two seasons with brilliant results, which induced Dr. Howard to give him his recommendation for South Africa. Over there he was very active and successful, having organized an extensive department in the short period of his service. One of his principal subjects in that field was locust extermination. He died of typhoid fever on January 14th, at the age of thirty-one years, having been married but ten months. He was developing into a man of commanding ability.

DR. RUDOLPH HEISER, of Keokuk, Iowa, died October 27, 1905. He was born in Moehlhausen, Thüringia, on March 10, 1839, and was sixty-seven years old at the time of his death. He came to this country in the early fifties with his parents, and has made Keokuk his home ever since. In the year 1866 he was united in marriage with Miss Emilie Roos, who, with one daughter, Miss Emma Heiser, and one sister, Mrs. Louis Stracke, of Warsaw, Ill., are left to mourn his death.

He was an enthusiastic naturalist, taking great interest in the branches of ornithology and entomology, of which he possessed a rare and valued collection. He was a skilled taxidermist, and for many years past was curator of the museum of the old Medical College. In his early life he enjoyed the sports of field and wood, and was one of the few remaining members of the old Nimrod Shooting Club, incorporated in 1870. He was a subscriber to the NEWS for many years.